

STATE OF OHIO  
DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF GEOLOGICAL SURVEY

REPORT OF INVESTIGATIONS NO.64

**THE  
PRECAMBRIAN SURFACE  
OF OHIO**

**By**

**GORDON L. OWENS**

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FLORIDA GEOLOGICAL SURVEY  
TALLAHASSEE

**COLUMBUS**

**1967**

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# THE PRECAMBRIAN SURFACE OF OHIO

by  
Gordon L. Owens

## INTRODUCTION

The absence of Precambrian outcrops in Ohio makes any study of these rocks dependent upon well and geophysical data. Various authors have published reports on Ohio's Precambrian surface as data became available. Hubbard (1932) gave a general description based on information from only 5 wells. Summerson (1962) had data on 38 basement wells in Ohio to support his map of the Precambrian surface. Fifty-six additional wells have penetrated the Precambrian in Ohio since 1962, bringing the total to 94 as of April 1967 (table 1). The Ohio well control has been supplemented by information from 39 basement wells drilled in the adjoining states and in Ontario, Canada (tables 2-7). Three of the Michigan wells and 6 of the Ontario wells are located just north of the map area. Precambrian surface elevations from these 133 wells constitute the control from which this map was constructed.

Control elevations were picked primarily from

well sample examinations by the author. A particular effort was made to differentiate Precambrian rocks from Cambrian arkosic rocks found immediately overlying the basement surface in many places in Ohio. The similar mineral assemblages and coloration of samples, compounded by small particle size, can make differentiation between these two systems quite difficult. Table 1 shows, however, that well samples are not available from all of the Ohio wells. In the absence of well samples Precambrian elevations were picked from gamma ray-neutron logs, electrical logs, or sample descriptions, or were taken verbatim from drillers' logs.

No attempt has been made to adjust the Precambrian sample elevations to compensate for the inherent time-lag-depth discrepancies common to samples from rotary-drilled wells. Such adjustments would have negligible effect on the 100-foot contour pattern.

## ACKNOWLEDGMENTS

Many individuals, companies, and State Geological Surveys have furnished information necessary for the completion of the accompanying contour map of the Precambrian surface. Current well data from areas surrounding Ohio were obtained from the following: T. A. Dawson of the Indiana Geological Survey, E. N. Wilson of the Kentucky Geological Survey, R. W. Kelly of the

Michigan Geological Survey, W. R. Wagner of the Pennsylvania Geological Survey, and R. B. Erwin and F. C. Hoodmaker of the West Virginia Geological Survey.

Information for the Ohio wells was obtained from the files and sample depository of the Division of Geological Survey, Department of Natural Resources, Ohio.



## PRECAMBRIAN STRUCTURAL AND TOPOGRAPHIC FEATURES

Plate 1 shows a structurally high Precambrian surface in western Ohio. It is bordered on the east by the Appalachian Geosyncline and continues westward into Indiana to the Illinois Basin. This gently undulating dissected surface has been described (Green, 1957) as the "Indiana-Ohio Platform," a name that is more accurate than the historical term "Cincinnati Arch." The area is hereafter referred to as the platform. In western Ohio the platform slopes 10-60 feet per mile to the west but slopes of approximately 20 feet per mile are most common. A map of Indiana's basement surface (Gutstadt, 1958, p. 18) shows that the 20-feet-per-mile slope continues into Indiana with very little change.

In northwestern Ohio the direction of slope of the platform gradually changes from west to northwest to north and increases from 30 to 60 feet per mile, outlining the generalized southern edge of the Michigan Basin. In central Wood County there is an anomalous area where the normal northwestward slope of the basement surface is reversed. Correlation of the gamma ray-neutron logs from wells located in the area of the anomaly shows no obvious indications of faulting. It is, therefore, quite possible that the anomaly represents an erosional remnant on the basement surface.

The slightly sinuous eastern edge of the platform forms a ridge that delineates a hingeline separating the eastern from the western slopes of the Precambrian surface. The ridge can be traced from the Chatham Sag (a synclinal depression separating the ridge from the Algonquin Arch) in Ontario, Canada, south through Ohio into eastern Kentucky. Control shows that the ridge is structurally higher than any other area of the platform. Relief along the ridge axis in Ohio is less than 600 feet and the highest area topographically is a strip 5 to 10 miles wide (measured on the -1900 foot contour) from Sandusky County through Champaign County.

Just east of the hingeline in Fayette County there is a topographic high on the basement surface. This linear feature terminates to the northeast in Pickaway County and to the southwest in Clinton County. A strong gravity anomaly mapped by Heiskanen and Uotila (1956) very closely coincides both in size and form with this high. An east-west seismic cross section (May-

hew, 1960) shows a small-displacement north-south-trending normal fault with the downthrown side to the east at the common border between Pickaway, Fayette, and Ross Counties. Elevations from three rather closely spaced wells in Wayne Township of Clinton County show abrupt reversals of the regional slope of the basement surface. Between the VanPelt well (P-5) and the McVey well (P-7) the 40-feet-per-mile eastward slope is essentially reversed and nearly doubled to 70 feet per mile. East from the VanPelt well to the Adams well (P-2) the basement surface slopes more steeply eastward at 350 feet per mile. Gamma ray-neutron log correlations show that the bottom 100 feet of the Cambrian section present in the two flanking wells (P-3 and P-7) is missing in the more centrally located VanPelt well. The evidence does not clearly indicate whether the Clinton-Fayette-Pickaway County Precambrian feature was formed by faulting, by erosion of the basement surface, or by a combination of the two processes.

Farther down the eastern slope of the basement surface, near Waverly in Ross County, Woodward (1961) described the "Waverly Arch." In southern and central Ohio, this proposed "Arch" would lie roughly 40 miles east of and parallel to the hingeline described herein and in northern Ohio the two features would partially overlap. Woodward suggests, as one alternative, that the "Arch" might have a Precambrian origin, but this is not supported by basement elevations from wells in central and eastern Ohio. These elevations furnished no evidence that the "Waverly Arch" exists on the basement surface.

In southeastern Ohio the eastern slope of the basement surface increases from 40 feet per mile at the hingeline to approximately 150 feet per mile in Washington County, adjacent to the West Virginia border. This steepening slope reflects the basement surface of the western limb of the Appalachian Geosyncline and the smooth generalized contours on the map reflect the scarcity of basement control in the area. Data from future deep wells in southeastern Ohio will no doubt show the Precambrian structural configuration to be much more complex than now shown.

From central Ohio to northeastern Ohio the basement surface slope changes direction pro-

gressively from east to southeast to south-southeast, following the northwestern outline of the Appalachian Geosyncline. The slope, averaging 85 feet per mile, is about half as steep as in extreme southeastern Ohio. A map of the Pre-

cambrian surface in southwestern Ontario (Sanford and Quillian, 1959) was most helpful in determining contour placement and in extending the basement contours from north-central Ohio into Ontario.

## CONCLUSIONS

The two most obvious features on Ohio's Precambrian surface are the Indiana-Ohio Platform in western Ohio and the western limb of the Appalachian Geosyncline in eastern Ohio. The structural hingeline separating these two features may prove to be more geologically important than either flanking structure. Structural,

stratigraphic, and reef traps containing commercial quantities of oil and gas have been found overlying and adjacent to such features. Existing evidence suggests at least partial fault control, a factor that may encourage further exploratory well drilling along this hingeline.

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CM	Cement marker elevation	KB	Kelly Bushing elevation	Sa	Sample log
DF	Derrick floor elevation	NA	Not available	So	Sonic log
FD	Formation density log	OWDD	Old well drilled deeper	T	Temperature log
GL	Ground level elevation	R	Resistivity log	TM	Topographic map elevation
GRN	Gamma ray - neutron log			VMSL	Virginia Military Survey Lot

TABLE 1 - WELLS DRILLED TO PRECAMBRIAN ROCKS IN OHIO

County	Township	Land division	Permit and map no.	Sample no.	Operator	Well no.	Lease	Completion date	Elev. at well head (ft above sea level)	Depth to PC (ft)	Elev. of PC (ft below sea level)	Total depth (ft)	Logs	Remarks
Adams	Jefferson	VMSL 2662	4	--	Cabot Corp.	1-A	A. Bailey	11-22-64	714	KB	-3026	3780	GRN, FD	GRN top
	Jefferson	VMSL 4040	5	1958	Commonwealth Gas Corp.	1	G. Covert	10-12-65	624	KB	-3148	3829	GRN, R	Sa top
Allen	Spencer	Sec. 22 (NE)	60	--	H. & H. Producing Co.	1	F. Pohlman	11-30-64	807	DF	-2379	3208	GRN	GRN top
Ashabula	Pierpont	Lot 60	193	1833	East Ohio Gas Co.	1	H. & D. Brayman	12-5-65	988	GL	-5947	8907	NA	Sa top
	Trumbull	Lot 30 (3Q)	191	1680	Horizon Oil, Inc.	1-H	A. Rhoads	8-12-65	978	GL	-5762	8750	NA	Sa top
Clark	Harmony	Sec. 3 (SE)	3	1229	Hodges Industries, Inc.	1	Elcanere Farms, Inc.	4-18-64	1181	NA	-2354	3570	GRN	Sa top
	Madison	Lot 2026	D-2	476	T. D. Friend	1	Mattison	6-14-26	1087	NA	-2398	4647	Sa	Sa top
	Pleasant	VMSL 4673	2	1048	Edmund Exploration	1	R. & E. Brown	3-29-62	1240	TM	-2384	3644	R, So	Sa top
Clermont	Sonolick	VMSL 681	3	939	Continental Oil Co.	1	C. Wilkoff	7-30-60	817	KB	-2493	3435	GRN, R, So	Sa top
Clinton	Wayne	VMSL 1065	2	772	Kewanee Oil Co.	1	P. Adams	10-31-58	1081	CM	-2309	3457	R	Sa top
	Wayne	VMSL 1065	5	813	Kewanee Oil Co.	1	Van Pelt	10-12-59	1092	KB	-2133	3259	R	Sa top
	Wayne	VMSL 808	7	837	Kewanee Oil Co.	1	H. & M. McVey	3-27-60	1087	CM	-2378	3465	R, So	Sa top
Crawford	Chalfield	Sec. 34 (SE)	50	1743	Hawkins & Hawkins	1	V. Leonhardt	10-12-65	1001	NA	-2769	3774	NA	Sa top
	Lykens	Sec. 31 (NE)	44	--	G. M. Piggott	1	Spittler-Brown Unit	5-30-65	977	KB	-2433	3413	GRN	GRN top
Delaware	Brown	Lot 7 (3Q)	242	1518	McClure Oil Co.	1	H. & H. Smith	3-7-65	979	KB	-3011	4035	NA	Sa top
	Genoa	Lot 4 (4Q)	269	1692	Minnesota-Oil Co.	1	B. Lindsey	11-28-65	919	KB	-3134	4071	NA	Sa top
	Orange	Lot 11 (3Q)	1	402	C. L. Wise	1	H. Vance	5-15-37	920	NA	-2925	4291	SA	Sa top
	Oxford	Lot 5 (1Q)	9	1034	Karl Wehmer	1	L. & K. Sprain	5-11-62	996	KB	-2998	4035	GRN, R	Sa top
	Porter	Lot 6 (1Q)	270	1850	Minnesota-Oil Co.	1	C. Gregory	12-14-65	1195	GL	-3490	4685	NA	Sa top
	Rador	Lot 1 (C)	22	1202	Southern Triangle Co.	1	F. Jones	1-15-64	945	KB	-2477	3428	GRN, R	Sa top
Erie	Florence	Lot 48 (4Q)	7	867	Ohio Fuel Gas Co.	1	M. P. Saylor	10-15-60	819	DF	-3581	4417	GRN	Sa top
	Florence	Lot 98	11	1928	Sun Oil Co.	1	Krysk-Wakefield	6-24-66	828	KB	-3627	4463	GRN, R	Sa top
	Florence	Lot 97 (1Q)	19	--	Sun Oil Co.	1	A. Herman	12-28-66	830	KB	-3620	4466	NA	Well card top
Fayette	Concord	VMSL 1002	2	751	Kewanee Oil Co.	1	E. Wilson	8-25-57	1017	CM	-2323	3494	GRN, R	Sa top
	Jasper	VMSL 5351	4	767	Kewanee Oil Co.	1	L. Barnes	11-28-58	1044	CM	-2331	3410	GRN, T	Sa top
	Union	VMSL 863	1	750	Kewanee Oil Co.	1	E. Hopkins	7-12-57	965	CM	-2605	4708	GRN, R, Sa	Sa top
Franklin	Franklin	VMSL 530	14	1926	Marble Cliff Quarries	1	Marble Cliff Quarries	1-30-65	687	KB	-2932	3623	GRN, R	Sa top
Guernsey	Adams	Sec. 15 (SW)	782	925	Lake Shore Pipeline Co.	1	W. R. Marshall Comm.	5-31-61	1007	KB	-7322	8622	GRN, R	Sa top
Hancock	Jackson	Sec. 8 (SE)	152	1952	Kin-Ark Oil Co.	1	J. G. Drummelsmith	7-13-66	809	KB	-1991	2805	NA	Sa top
	Marion	Sec. 3	1586	477	J. E. Fennery	1	D. L. Norris	1912?	830	NA	-1940	2980	NA	Sa top
	Union	Sec. 24 (SE)	139	1266	Frank M. Dever	1	C. & M. Frazier	6-2-64	824	DF	-2191	3017	GRN, R	Sa top
Hardin	Jackson	Sec. 30 (SW)	74	1015	Norman W. Edmund	1	D. & D. Jones	4-10-62	941	KB	-1877	2834	R, So	Sa top
Highland	Fairfield	2 mi. N. of Leesburg	1	822	Kewanee Oil Co.	1	H. & F. Pavey	11-1-59	1043	KB	-2437	3512	R	Sa top
Hooking	Starr	Sec. 31 (NE)	1222	1948	E. J. Dunigan, Jr.	1	M. & H. Hockman	6-30-66	970	KB	-5499	6495	GRN, R	Sa top

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Huron	Peru	Sec. 2	11	163-B	C. W. White	1	P. & B. Arting	11-22-37	749	NA	-3152	4270	Sa	Top from orig. smpl. descr.
Jackson	Franklin	Sec. 23 (SW)	76	1625	Ralph Halbert	1	G. & L. Wood	7-8-64	820	KB	-5398	6320	GRN, R	Sa top
	Franklin	Sec. 31 (SW)	79	1627	Ralph Halbert	1	W. G. Brown	9-17-64	841	DF	-5149	5991	NA	Well card top
	Hamilton	Sec. 28 (SE)	78	1626	Ralph Halbert	1	Slavens	8-13-64	655	NA	-4920	5681	NA	Sa top
Knox	Hilliar	Lot 21 (3Q)	1604	1467	Kin-Ark Oil Co.	1	C. G. Huffman	12-31-64	1183	KB	-3597	4807	So	Sa top
	Milford	Sec. 10 (NW)	1468	1055	Ohio Fuel Gas Co.	1	G. D. Larimore	1-9-63	1204	KB	-5355	5376	GRN	Sa top
	Pike	Sec. 9 (NE)	1413	1839	David L. Cantway	1	E. E. Cunningham	8-7-61	1252	KB	-4463	5745	R, So	R top
	Symmes	Sec. 13 (SW)	174	927	J. Stanley Goldberg	1	A. J. Payne	10-1-63	600	NA	--	7002	--	OWDD, no info.
Licking	Hartford	Lot 2 (3Q)	2057	1213	Howard D. Atha	1	H. & M. Roberts	2-29-64	1179	KB	-3731	4952	GRN, R	Sa top
	Lima	Lot 16 (3Q)	2252	1717	Ashland Oil & Ref. Co.	1	C. S. Schmelzer	8-30-65	1080	KB	-4785	4802	NA	Sa top
	Mary Ann	Sec. 15 (NW)	1826	1062	Lake Shore Pipeline Co.	1	L. P. Crowley	8-15-61	1080	KB	-5978	5991	GRN, R, So	Sa top
Logan	McArthur	VMSL 9930	18	S-192 C-645	Ohio Oil Co.	1	V. Johns et al.	7-9-47	1186	GL	-2064	3361	R, Sa	Sa top
Lorain	Henrietta	Lot 8 (SW)	794	894	East Ohio Gas Co.	1	A. & A. Born	11-14-60	850	DF	-3723	4590	GRN	Sa top
Madison	Fairfield	VMSL 9717	3	1694	Amerada Petr. Corp.	1	J. R. Hume	11-1-65	995	KB	-2619	3631	GRN, R, So	Sa top
Marion	Claridon	Sec. 27 (NE)	8	1086	United Producing	1	H. & M. Mitchell	3-14-62	1001	KB	-2664	3672	GRN, R	Sa top
	Claridon	Sec. 32 (NW)	49	--	Midland Drilg. Co.	1	F. L. Gruber	6-15-64	981	KB	-2468	3452	GRN	Drig. time top
Medina	Granger	Lot 42 (SE)	1201	812	Ohio Fuel Gas Co.	1	M. E. Warner	8-25-59	1117	KB	-5528	8728	So	Sa top
	Hindley	Lot 69 (NW)	1143	819	Wiser Oil Co.	1-A	F. L. Smith	1-3-59	1200	KB	-5375	7040	GRN, R	Sa top
Miami	Lost Creek Washington	Sec. 13 (NW)	3	764	National Assoc. Petroleum Sun Oil Co.	1	E. Walker	5-8-62	1035	KB	-2210	3513	GRN	Sa top
Morrow	Bennington	Lot 13 (3Q)	1388	1353	Robert Wray	1	J. & B. McBee	4-11-64	1140	KB	-3295	4450	GRN, R, So	Sa top
	Canan	Sec. 19 (SW)	2550	1719	Otter-Creek Expl. Co.	1	J. & J. Irey	6-11-65	1004	KB	-2866	3876	NA	Sa top
Peru	Cardington	Sec. 33 (NW)	12	1079	United Producing Co.	3	O. & E. Myers	7-28-61	1016	KB	-2895	4100	GRN, R	Sa top
	Peru	Sec. 18 (SW)	1935	1338	Comanche Oil Co.	1-C	E. & V. Bush	8-22-64	999	KB	-2865	3866	GRN, R	GRN top
	Peru	Lot 16 (1Q)	1681	1300	Kin-Ark Oil Co.	5	Shaver-Neff Unit	6-19-64	1008	KB	-3187	4215	GRN	Sa top
	Troy	Sec. 18 (NW)	47	1033	Pan American Petr. Corp.	1	A. C. Windbigler	11-2-62	1398	KB	-3474	4890	GRN, R	Sa top
	Westfield	Sec. 21 (SE)	33	1036	Karl Wehnemeyer	1	J. W. Henry	1-8-62	994	KB	-3014	4048	GRN, R, So	Sa top
Noble	Elk	Sec. 31 (SE)	1278	--	Amerada Petr. Corp.	1	Robert Ullman	--	--	KB	--	11,442	--	--
Pickaway	Jackson	VMSL 7947	4	1393	McMahon-Bullington Co.	1	M. M. Croman	9-8-63	797	KB	-2888	3731	NA	Sa top
	Monroe	VMSL 4290	2	786	Kewanee Oil Co.	1-A	H. Long	1-16-59	856	CM	-2334	3257	R, T	Sa top
	Pickaway	Sec. 7W (NE)	6	1540	Midwest Oil & Gas Co.	1	C. A. Miller	10-2-64	693	DF	-3455	4179	GRN, R, So	Sa top
Putnam	Liberty	Sec. 29 (SW)	31	156	Ohio Oil Co.	1	L. Barlage	3-21-44	740	NA	-2510	3377	NA	Sa top
Richland	Washington	Sec. 14 (SW)	431	--	Tri-State Producing Co.	2	C. & K. Scott	9-5-66	1437?	NA	-3946	5503	NA	Well card top
Ross	Concord	VMSL no. NA	9	1454	Crest Oil Co.	1	O. & O. Clark	12-29-64	1035	KB	-2810	3863	GRN, R	Sa top
Sandusky	Ballville	Sec. 31 (SW)	126	--	C. & E. Oil Co.	1	R. C. Recker	2-6-65	875	DF	-1940	2677	GRN, Sa, So	Sa top
	Madison	Sec. 22 (SE)	146	--	Russell Maguire Co.	1	Aleshire-Marathon	10-4-65	708	KB	-2050	2759	GRN, R	GRN top
	Rice	Sec. 30 (NW)	1	--	W. A. Montgomery	1	N. T. Hetrick	8-1-36	590	GL	-2111	2796	NA	Well card top
	Townsend	Sec. 33 (NW)	77	895	East Ohio Gas Co.	1	V. & L. Hafl	12-2-60	644	DF	-2451	3123	GRN, R, So	Sa top
	Woodville	Sec. 9 (NW)	--	305	Ohio Oil Co.	1	W. H. Bruns	9-22-02	655	GL	-2015	2822	Sa	Sa top
	Woodville	Sec. 36 (NW)	147	1853	Russell Maguire Co.	1	P. L. Kerbel	11-28-65	647	KB	-2088	2782	GRN, R	Sa top
Seneca	Adams	Sec. 31 (NE)	128	1576	Ashland Oil & Ref. Co.	1	W. P. Stigmair	1-24-65	796	KB	-2351	3175	GRN, R, So	Sa top
	Pleasant	Sec. 28 (NE)	D-32	--	Sun Oil Co.	2	T. Watson Heirs	3-20-12	710	TM	-2190	2935	NA	Well card top



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Shelby	Perry Salem	Sec. 24 (SW) Sec. 3 (NW)	12	687	Sun Oil Co. Gump Oil Co.	1	D. M. Nelson J. & B. Fogt	12-17-55	1050	DF	-2093	3276	GRN	Sa top
			13	702		1		11-10-56	1037	GL	-2246	3360	Sa	Sa top
Union	Union Washington	VMSL 7474 VMSL 10938	2	937	H. H. & R. Oper. Acct. T. & W. Oil Co.	1	Zenth Holding & Trading R. & A. Lane	6-23-61	1001	KB	-2344	3352	GRN, R	Sa top
			13	--		1		9-19-64	996	NA	-1969	2989	NA	Well card top
Wayne	Chippewa Wayne	Sec. 21 (SW) Sec. 14 (SE)	71	--	East Ohio Gas Co. Great Lakes Gas Corp.	2	N. J. Steiner A. Drake	8-12-61	980	KB	-5940	6919	GRN, R, So	Sa top
			1419	1944		1		9-20-65	1151	KB	-5549	6897	GRN	GRN top
Williams	St. Joseph	Sec. 21 (NE)	34	1691	Walter Beglinger	1	O. J. Kennert	4-20-65	842	DF	-3083	4136	GRN	GRN top
Wood	Center Liberty	Sec. 4 (SE) Sec. 31 (SW) Sec. 12 (SE) Sec. 36 (SW) Sec. 21-w (SE) Sec. 1 (NW)	237	1468	Kin-Ark Oil Co. Southern Triangle Oil Co. J. S. Bralley J. I. O'Neill J. R. S. Co. Kin-Ark Oil Co.	1	E. Carter	1-11-65	672	KB	-2138	2827	GRN, R	Sa top
			229	1317		1	B. B. Knauss	7-5-64	694	KB	-2028	2764	R	Sa top
			--	626		1	S. E. Killian	8-25-37	680	TM	-2200	2927	Sa	Sa top
			231	--		1	L. L. Peek	9-14-64	698	KB	-2062	2770	GRN, R	GRN top
			239	1656		1	C. Asmus	5-25-65	670	KB	-2130	2825	NA	Sa top
			236	1466		1	R. Smith	1-3-65	677	KB	-2096	2786	GRN	Sa top
Wyandot	Crawford Eden Jackson Milflin Salem	Sec. 18 (NW) Sec. 3 (SE) Sec. 36 (NE) Sec. 14 (NW) Sec. 31 (SW)	72	--	Ohio Oil Co. Minnesota-Ohio Oil Co. Dibble & Miller Texaco, Inc. Comanche Oil Co.	1	N. Heck	5-12-42	880	GL	-1940	2801	Sa	Sa top
			211	1706		1	G. Eyestone	10-11-65	935	GL	-2305	3260	NA	Sa top
			D-8	171		1	P. M. Parsell	3-7-47	910	TM	--	5632	NA	Sampls. missing
			174	1222		1	M. E. Bowen	4-30-64	833	GL	-2017	2902	GRN, R	Sa top
			173	1214		1	L. Frey	2-1-64	885	GL	-1997	2875	NA	Sa top

TABLE 2 - WELLS DRILLED TO PRECAMBRIAN ROCKS IN INDIANA

County	Township	Land division	Permit and map no.	Sample no.	Operator	Well no.	Lease	Completion date	Elev. at well head (ft above sea level)	Depth to PC (ft)	Elev. of PC (ft below sea level)	Total depth (ft)	Logs	Remarks
Allen	Pleasant	Sec. 33, T. 28 N., R. 12 E.	5012	2086	Tecumseh Oil & Gas Co.	1	J. W. Gibson	10-22-47	822	GL	-2654	3517	NA	All data furnished by the Indiana Geological Survey
Henry	Dudley	Sec. 12, T. 16 N., R. 11 E.	3215	1509	Ohio Oil Co.	1	H. & N. May	10-17-45	1060	NA	-2589	3664	NA	
Jay	Jackson	Sec. 29, T. 24 N., R. 13 E.	622	--	Petroleum Dev. Corp.	1	Jacob Blinagar	4-1-40	944	NA	-2407	3404	NA	
	Jackson	Sec. 29, T. 24 N., R. 13 E.	2615	4727	Farm Bureau Oil Co., Inc.	1	J. & G. Blinagar	5-10-44	949	DF	-2394	3395	NA	
Wayne	Abbotton	Sec. 23, T. 15 N., R. 13 E.	7467	--	Porter Gorten	1	M. L. Doodridge	2-10-50	957	NA	-2478	3907	NA	

TABLE 3 - WELLS DRILLED TO PRECAMBRIAN ROCKS IN KENTUCKY

County	Carter coordinates and map no.	Code no.	Operator	Well no.	Lease	Elev. at well head (ft above sea level)	Depth to PC (ft)	Elev. of PC (ft below sea level)	Total depth (ft)	Logs	Remarks
Boone	9-EE-58	4	Cecil Connors	1	F. M. Ford	908 KB	3694	-2786	4089	NA	All data furnished by the Kentucky Geological Survey
Cartier	3-V-77	6	United Fuel Gas Co.	1	L. L. Stamper	857 KB	5058	-4201	5085	NA	
Cartier	12-V-77	15	Ashland-Cabot	1	Stapleton	948 GL	5220	-4272	5251	NA	
Elliot	22-T-76	5	United Fuel Gas Co.	1	J. H. Litton	968 NA	5190	-4222	5394	NA	
Lewis	13-Y-76	7	Ralph Thomas	1	D. Adams	580 KB	4154	-3594	4190	NA	
Lewis	19-W-75	9	United Fuel Gas Co.	1	A. Shepherd	915 KB	4535	-3620	4550	NA	
Mason	15-Y-71	8	United Fuel Gas Co.	1	W. Rawlings	789 KB	3275	-2506	3314	NA	
Montgomery	8-R-87	10	Ferguson & Bosworth	16-1	A. Potter	989 NA	4363	-3374	4481	NA	
Rowan	4-T-75	11	Pennzoil	1	C. Jones	1194 GL	4968	-3774	4991	NA	

TABLE 4 - WELLS DRILLED TO PRECAMBRIAN ROCKS IN MICHIGAN\*

County	Township	Land division	Permit and map no.	Operator	Well no.	Lease	Completion date	Elev. at well head (ft above sea level)	Depth to PC (ft)	Elev. of PC (ft below sea level)	Total depth (ft)	Logs	Remarks
Lenawee	Riga	Sec. 32, T. 8 S., R. 5 E.	SP 10448	Walter Cerkert	1	H. Taylor	1944	715 NA	3877	-3162	3902	NA	All data furnished by the Michigan Geological Survey
Monroe	Berlin	Sec. 29, T. 5 S., R. 10 E.	SP 11221	Joseph Sturman	1	D. & R. Chapman	1945	602 NA	3375	-2773	3377	NA	
	Ida	Sec. 19, T. 7 S., R. 7 E.	SP 7702	Jacob Beck	1	Mrs. J. Sancerant	1954	669 NA	3625	-2956	5495	NA	
	Summerfield	Sec. 16, T. 7 S., R. 6 E.	SP 25494	Ferguson & Garrison	1	M. Shimp	1964	686 NA	3637	-2951	3671	NA	
Washtenaw	Salem	Sec. 27, T. 1 S., R. 7 E.	SP 10792	L. C. Chamness	1	Troy-Roddenberry	1944	886 NA	6075	-5189	6094	NA	
	Salem	Sec. 16, T. 1 S., R. 7 E.	SP 10141	Colvin & Assoc. & Elec.	1	W. Voss Comm.	1944	915 NA	5374	-5459	6410	NA	
	Superior	Sec. 12, T. 2 S., R. 7 E.	SP 11341	Colvin & Assoc. & Rot. St.	1	V. Meinzinger	1945	818 NA	5670	-4852	5692	NA	
Wayne	Huron	Sec. 16, T. 4 S., R. 9 E.	SP 10430	Colvin & Assoc. & Elec.	1	Theisen Estate	1944	825 NA	3985	-3360	4046	NA	

\*Wells SP 10792, SP 10141, and SP 11341 lie just north of the map area.

TABLE 5 - WELLS DRILLED TO PRECAMBRIAN ROCKS IN PENNSYLVANIA

County	Quadrangle	Location	Map no.	Operator	Well no.	Lease	Completion date	Elev. at well head (ft above sea level)	Depth to PC (ft)	Elev. of PC (ft below sea level)	Total depth (ft)	Logs	Remarks
Crawford	Lineville	5, 591' S. of lat 41°30' N. 9, 690' E. of long 80°25' W.	PA-1	Benedum & Ark-La Gas Co.	1	J. Kardosh	9-1958	1337	KB	7908	8030	NA	PC top from Pa. Geol. Survey
Erie	Northeast	23, 800' S. of lat 42°05' N. 15, 450' W. of long 79°50' W.	PA-2	Consolidated Gas Corp.	1	B. Dennee	10-1965	1463	GL	7430	7485	NA	Core descr. top
	Northeast	8, 800' S. of lat 42°15' N. 12, 800' W. of long 80°05' W.	PA-3	Hammermill Paper Co.	2	Hammermill	8-1964	650	GL	5952	5972	NA	PC top from Pa. Geol. Survey
Mercer	Stoneboro	23, 750' S. of lat 41°25' N. 2, 650' W. of long 80°10' W.	PA-4	Peoples Nat. Gas Co.	1	R. Temple	6-1965	1344	KB	9811	9919	NA	

TABLE 6 - WELLS DRILLED TO PRECAMBRIAN ROCKS IN WEST VIRGINIA

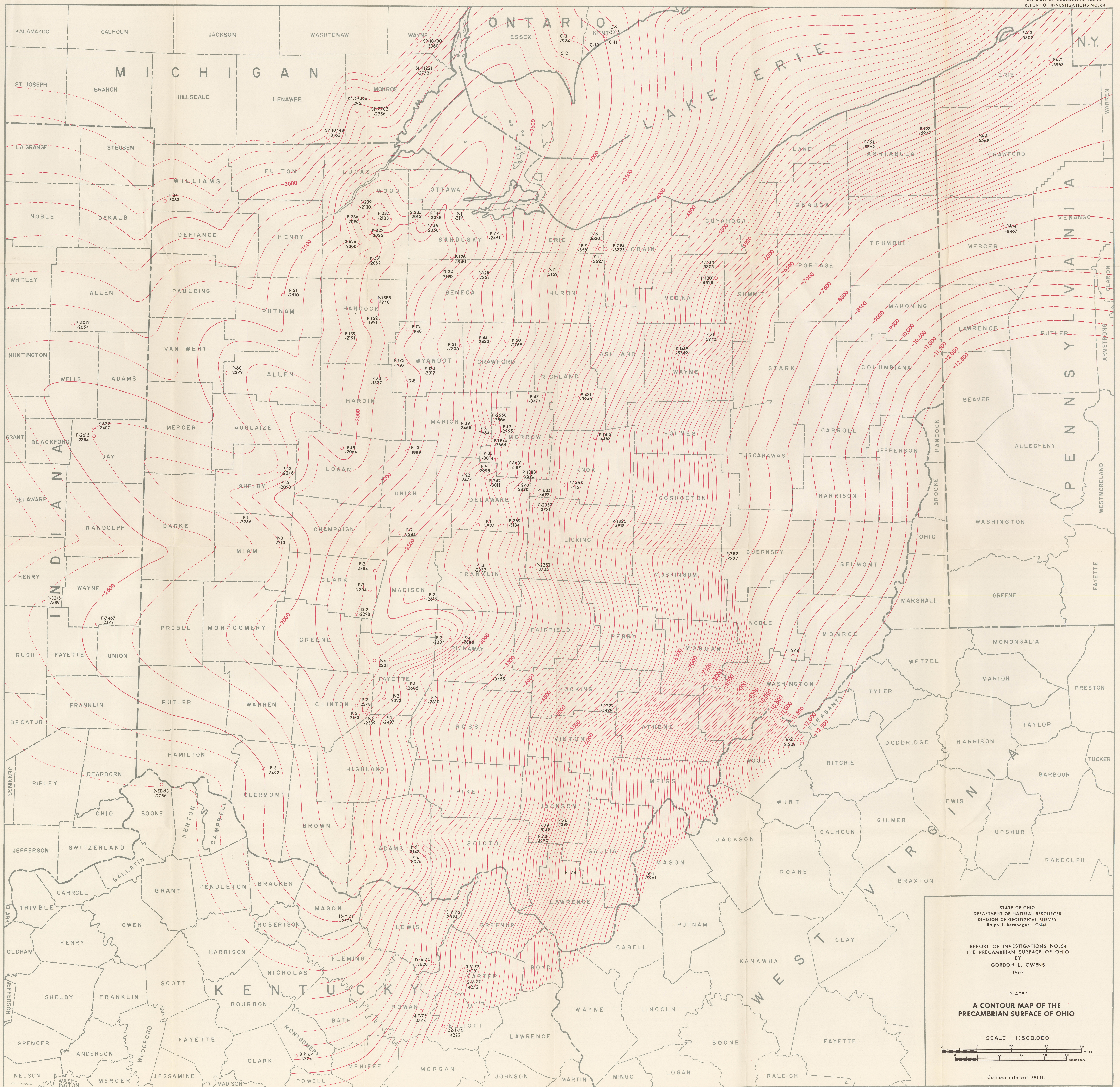
County	District	Location	Map no.	Operator	Well no.	Lease	Completion date	Elev. at well head (ft above sea level)	Depth to PC (ft)	Elev. of PC (ft below sea level)	Total depth (ft)	Logs	Remarks
Mason	Clendenin	2, 5 mi. S. of lat 38°45' N. 4, 12 mi. W. of long 82°22' W.	W-1	United Fuel Gas Co.	1	Grover Arrington	8-7-59	597	GL	8558	8635	NA	All data from West Virginia Geological Survey
Wood	Walker	5, 4 mi. S. of lat 39°20' N. 1, 14 mi. W. of long 81°15' W.	W-2	Hope Nat. Gas et al.	1	Powers Oil Co.	1-1955	1045	KB	13, 273	13, 331	GRN, R	

TABLE 7 - WELLS DRILLED TO PRECAMBRIAN ROCKS IN ONTARIO, CANADA\*

County	Township	Land division	Map no.	Operator	Well no.	Lease	Completion date	Elev. at well head (ft above sea level)	Depth to PC (ft)	Elev. of PC (ft below sea level)	Total depth (ft)	Logs	Remarks
Essex	Mersea	Lot 10, con. 7	C-2	Imperial Oil Ltd., Mersea 10-7	1	G. Stewart	1958	--	--	3462	3490	NA	All data from Geological Survey of Canada Paper 58-12
Kent	Tilbury W.	Lot 14, con. 11	C-3	Union-Imperial #3	1	Ainslee & Miravik	1946	605	NA	3529	3549	NA	
	Chatham	Lot 6, con. 1	C-4	A. Conliffe #1	--	--	1940	598	NA	3802	3812	NA	
	Dover W.	Lot 1, con. 3	C-5	Union Natural Gas #2	--	--	--	575	NA	3765	3770	NA	
	Dover W.	Lot 3, con. 3	C-6	Union Natural Gas #19	--	--	1925	577	NA	3765	3774	NA	
	Harwich	Lot 4, con. 4, West Communication Rd.	C-7	Imperial Oil Ltd. #542	--	--	1956	583	NA	4046	4078	NA	
	Howard	Lot 92, Broken Front Lake Erie	C-8	Imperial Oil Ltd. #530	3A	Morpeth	1955	809	NA	4195	4206	NA	
	Romney	Lot A, Gore con.	C-9	Imperial-Union-Dominion	1	T. Austin	1958	629	NA	3644	3653	NA	
	Romney	Lot 18, con. 6	C-10	Imperial Oil Ltd.	--	O. & L. Larson	1958	--	--	3587	3589	NA	
	Romney	Lot 90, con. 2	C-11	Adaskin Romney 18-6	--	D. A. Shanks	1958	--	--	3683	3671	NA	
	Tilbury E.	Lot 1, con. 3	C-12	Bluewater-Transvalley Union Natural Gas #6	--	--	1917	578	NA	3735	3740	NA	

\*Wells C-4, C-5, C-6, C-7, C-8, and C-12 lie just north of the map area.





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